

Reece

P. 7757

Sm. 800

On the Influence of Small Pox
Hospitals in London

Practitioner

March 1887



Department of Public Health.

ON THE INFLUENCE OF SMALL-POX HOSPITALS IN LONDON.

DR. BUCHANAN'S recently issued annual report on the proceedings of the Medical Department of the Local Government Board during 1885 deals in a prominent way with the subject of the influence of the small-pox hospitals in London. It will be remembered that, after complaints as to the spread of small-pox around the Hampstead and other metropolitan small-pox hospitals, an inquiry was in 1880 set on foot by the Local Government Board in order to ascertain whether, in connexion with the then commencing use of the Fulham Hospital for the reception of small-pox patients, the infection was likely to be spread to the surrounding community. The resulting report by Mr. W. H. Power¹ has always been regarded as a masterpiece of exhaustive research, and his method of work has, as a rule, been followed by others who have subsequently taken up the same subject. Over a "Special Area" which was included within a circle of a mile radius from the hospital as a centre, a careful survey was made as to the number of houses and inhabitants, and this special area was compared as regards small-pox with the remainder of the three parishes of Chelsea, Fulham, and Kensington. The first comparison is between those areas before there was any small-pox hospital at Fulham and after the establishment of the hospital, and from the annexed table it will be seen that after the opening of the hospital there was a great change in the incidence of small-pox

¹ Official Supplement by the Medical Officer, to the Tenth Annual Report of the Local Government Board, "On the Use and Influence of Hospitals for Infectious Diseases." Re-issue 1882 [C. 3290].

in the two areas. In both it had increased, but in the special area the increase was seven or eight times, whilst in other parts it was not twice as great as the amount that had existed before the opening of the hospital. This fact taken alone did not prove much, but taken together with subsequent observations it is of great interest.

RATES PER 100 HOUSES IN EACH AREA REFERRED TO.

| Periods. | Whole of the three parishes. | The special area. | Other parts of the parishes outside the special area. |
|---|------------------------------|-------------------|---|
| March 1876 to March 1877. No small-pox hospital in the parishes. } | 0·41 | 0·15 | 0·54 |
| March 1877 to the end of 1877. } Small-pox hospital in the special area. } | 0·94 | 1·10 | 0·86 |

Towards the end of December 1880 small-pox patients were sent from other parts of London into the Fulham Hospital, and as long as these cases were convalescents from other hospitals no injurious influence appeared to be exerted. But by the end of the fortnight ending January 22nd 1881 some eighty acute cases had been admitted, and during the ensuing fortnight ending February 5th a special outburst of small-pox took place around the hospital. The special area of one mile circle being now divided into a central circle of a quarter-mile radius and three outer quarter-mile rings, investigation as to the distributions of first attacks of small-pox in houses in these several areas up to the fortnight ending April 2nd gave the following results in rates per cent. of houses attacked :—On the $0-\frac{1}{4}$ mile circle 3·00, on the $\frac{1}{4}-\frac{1}{2}$ mile ring 1·54, on the $\frac{1}{2}-\frac{3}{4}$ mile ring 1·25, on the $\frac{3}{4}-1$ mile ring 0·61. We must refer to Mr. Power's report itself for the details of the exhaustive investigation which took place in order to substantiate the accuracy of these statistics, and in order to ascertain their significance. On the present occasion we are only dealing with them by way of summary and in order to give some connected account of the history of this piece of research so as to bring it down to current date. We therefore

at once pass on to point out that, when it had been ascertained that during the 1880—81 epidemic the percentage of houses invaded in the neighbourhood of the hospital had become gradually smaller as the distance of the houses from the hospital increased, the facts as to previous successive epidemics in the same neighbourhood were examined in order to see if the 1880—81 results were merely accidental or were in accord with former results. The outcome of this further investigation is indicated in the annexed table, which shows the admissions of acute small-pox into the Fulham Hospital and the incidence of small-pox upon houses in the several divisions of the special area, during five epidemic periods after opening of the hospital.

| Cases of Acute Small-pox admitted. | In Epidemic Periods since opening of Hospital. | Incidence on every 100 Houses within the Special Area and its divisions. | | | | |
|------------------------------------|--|--|---|--|---|---------------------------------------|
| | | On total special area. | On small circle, 0— $\frac{1}{4}$ mile. | On first ring, $\frac{1}{4}$ — $\frac{1}{2}$ mile. | On second ring, $\frac{1}{2}$ — $\frac{3}{4}$ mile. | On third ring, $\frac{3}{4}$ —1 mile. |
| 327 | March 1877—end 1877 | 1·10 | 3·47 | 1·37 | 1·27 | 0·36 |
| 714 | Jan. 1878—Sept. 1878 | 1·80 | 4·62 | 2·55 | 1·84 | 0·67 |
| 679 | Sept. 1878—Oct. 1879 | 1·68 | 4·40 | 2·63 | 1·49 | 0·64 |
| 292 | Oct. 1879—Dec. 1880 | 0·58 | 1·85 | 1·06 | 0·30 | 0·23 |
| 515 | Dec. 1880—April 1881 | 1·21 | 3·00 | 1·54 | 1·25 | 0·61 |
| 2,527 | Five Periods | 6·37 | 17·35 | 9·20 | 6·16 | 2·37 |

Thus, the experience of former years proved at each successive step to be in complete accord with the carefully investigated experience of 1881. And this accumulated experience was to the effect that, in proportion as, at any given distance from the hospital, there were houses to be affected, the houses became affected by small-pox, and this no matter what their direction from the hospital. Then came investigation into the conditions by which this repeated experience had been brought about, and it was ascertained that the machinery of the hospital administration, with inclusion of defects in that machinery and in the ambulance traffic, did not suffice to account for the peculiarity of the incidence of small-pox around the institution. It was finally regarded by Mr. Power as highly probable that the results had during the 1881 epidemic, and in former epidemics, been

brought about mainly by atmospheric circumstances ; and that exceptional outbursts during one and another epidemic within the limits of the special area had resulted from atmospheric circumstances of particular times having afforded a peculiar facility for the dissemination in an undamaged state and near to the hospital of matter given off from the hospital. In short, it was held that the results experienced could only be accounted for by an atmospheric distribution of the contagium of small-pox.

The results of the whole 1880—81 inquiry were summed up as follows :—

1. There has been in each epidemic period an excessive incidence of small-pox in houses in the neighbourhood of the hospital as compared with more distant houses in Chelsea, Fulham, and Kensington.

2. The percentage of houses invaded in the neighbourhood of the hospital has become gradually smaller as the distance of the houses from the hospital has increased. This gradation has been very exact and very constant.

3. Houses upon the chief lines of human intercourse with the hospital have not suffered more than houses lying in other directions from the hospital.

4. In point of time, there has been a very marked relation between the varying use of the hospital and the manifestation of excessive small-pox in the neighbourhood. This relation has not shown itself while the use of the hospital has been for convalescents only.

5. The appearance of excessive small-pox in houses around the hospital has never been delayed until the hospital has become full or nearly full. It has always been most remarkable at the time when admissions to the hospital were beginning to increase rapidly.

6. On comparison of the different epidemics, an almost constant ratio is observed between the amount of the hospital operations and the degree of excess of small-pox in the neighbourhood.

7. The machinery of the hospital, with inclusion of defects in that machinery, does not account for the peculiarity of small-pox incidence within the three parishes of Chelsea, Fulham, and Kensington, since the establishment of the hospital.

8. There must have been some condition or conditions operating to produce the observed distribution of small-pox around the hospital that have pertained to the hospital as such and that have been in excess of the condition of small-pox extension as usually recognised.

9. During the present epidemic, and most probably during former similar periods, there has arisen in the atmospheric circumstances of the time peculiar facility for the dissemination in an undamaged state of any matter that may have been given off from the hospital.

When this report was issued Dr. Buchanan wished it to be distinctly noted that it related to Fulham Hospital only, and that it was possible that the circumstances of that hospital were in some way exceptional. But that which had been ascertained

rendered it necessary to continue the investigation. Mr. Power's work was therefore proceeded with, and in the meantime a Royal Commission had been appointed for the further examination of the subject. This Commission, reporting in 1882, arrived at the conclusion, "That by some means or other the asylums hospitals, in their present shape, cause an increase of small-pox in their neighbourhoods, appears to us clearly established by the experience of these (five) hospitals during the last ten years." Thus, the other small-pox hospitals, under similar administration as the Fulham Hospital, were included in the same condemnation as Fulham had come under, and the Commission advised that small-pox should, in these metropolitan hospitals, be limited to some thirty or forty acute cases, and that everything should be done that could be devised, in the construction and management of such hospitals, to reduce the chance of their spreading infection.

Mr. Power's next report¹ on the subject dealt with observations at Fulham in 1884, at which date the hospital again came into use for the first time after the conclusion of the previous small-pox epidemic. In March of that year small-pox again became prevalent in the metropolis, and on May 15th the Fulham hospital was re-opened. But it re-opened under widely different circumstances. On no occasion was it allowed to contain at one time more than thirty-five patients; and its administration was altogether changed to meet the difficulties experienced in 1881. Communications with the outside world were reduced to a minimum, and even such as were allowed to take place were subjected to rigid restrictions and precautionary measures, the result being that any effects which might result from these were insignificant compared with those of 1881. The ambulance traffic was also taken in hand by the Asylums Board themselves and placed under stringent restrictions. In short, a set of precautions was carried into effect "almost in excess of any that could have been anticipated."

Previous to the re-opening of the hospital a few cases of small-pox had occurred in the surrounding parishes, but the parishes as a whole exhibited a history of freedom from the disease, and it is clearly shown that there was the reverse of any special

¹ Supplement by the Medical Officer to the Fourteenth Annual Report of the Local Government Board. 1885 [C. 4516].

incidence in the special area around the hospital. To quote Mr. Power:—Over the whole period, January to May 24th, 1884, “the special area and other parts of the parishes have suffered small-pox relatively in very similar amounts, and of small-pox occurring in the special area the chief incidence has certainly not been on the zones nearest to the hospital.” Under these circumstances the hospital came into use, nine patients being admitted in the ten days to May 24th. In the next fortnight, that ending June 7th, a marked increase of small-pox occurred in the three parishes concerned, an increase fourfold in a fortnight of newly-invaded houses, which now numbered thirty-seven; and of these thirty-seven as many as twenty-five were in the special area. So also, upon differentiation within the special area of this excessive small-pox there occurring, it was found to exhibit a graduated intensity of incidence on the several zones of the area in the order of their recession from the hospital as a centre. And this graduation was practically a reproduction of that which had been observed in 1881. In the seven days, May 31st to June 6th, it was as follows:—

| | | | | |
|--|----|---|----|-------------|
| In the special area, from 31st May to 6th June, there were houses invaded— | | | | |
| In the small $\frac{1}{4}$ mile circle containing | } | 2 = 44 per cent. of houses in the circle. | | |
| the hospital | | | | |
| In the zone $\frac{1}{4}$ – $\frac{1}{2}$ mile from the hospital | 10 | = | 26 | „ „ „ zone. |
| In the zone $\frac{1}{2}$ – $\frac{3}{4}$ mile from the hospital | 7 | = | 12 | „ „ „ „ |
| In the zone $\frac{3}{4}$ –1 mile from the hospital | 5 | = | 10 | „ „ „ „ |

The factor leading to the mischief remained during active use of the hospital more or less in operation until August, and the small-pox was found to have been distributed in all directions around the hospital, without regard to ambulance routes or lines of communication between the outside world and the hospital. Indeed, the incidence of the disease being shown in the several quadrants of the circular area within one mile of the hospital, it was seen to be as follows:—

On the S.E., S.W., and N.W. quadrants 0.51, 0.45, and 0.46 per cent. of the houses respectively became invaded, whereas in the N.E. quadrant, which is the one exceptionally traversed by ambulances, it was only 0.40 per cent.

It is noteworthy that, within three weeks of the re-opening of the hospital, no less than eighteen houses in the area became invaded. This occurrence took place in the three days, June 1st

to 3rd, one-half of the attacks being on June 1st, and yet only nine patients had been admitted, and at no time since May 15th had the number of persons in the hospital acutely ill of small-pox exceeded five. These 1884 results, if taken alone, might not have much significance, but bearing in mind that they were in so many essential respects a precise repetition of the repeated experiences from 1877 to 1881, they came to be of the utmost importance.

As regards out-goings from the hospital and such like in 1884, they were at a minimum antecedent to the occurrence described, and every effort to associate the event with any such personal communications failed. At this point Mr. Power recalls how, in 1881, under similar circumstances, he had had to consider atmospheric convection as a means by which small-pox infection might travel for longer distances than had before been suspected, and at the same time get distributed in a particular instance fairly equably on all sides of the hospital; and how he then went on to see whether or not conditions of atmosphere which he regarded as favourable to dissemination equably of particulate matter were present during certain designated days of January 1881 in which a singularly simultaneous and uniformly distributed spread of small-pox had occurred round Fulham Hospital. As a matter of fact, he says:—"I found that the days in question, the days on which the peculiar distribution of small-pox around the hospital had actually taken place, were characterised by those very atmospheric conditions which I had regarded as being most favourable to the uniform dissemination within the limits of the special area of particulate matter air-borne from the hospital. Two weeks after the prevalence of these exceptional atmospheric conditions there had occurred around the hospital a special incidence of small-pox upon the houses of Chelsea, Fulham, and Kensington, an incidence markedly diminishing in intensity as the houses were situated farther from the hospital centre, and having the further remarkable peculiarity—which I was unable to explain on any hypothesis of human convection—that the incidence was independent of the points of the compass, but affected indifferently, north, south, east, and west, where the distance from the hospital was the same. It was inevitable that the known conditions for the atmospheric dissemination of par-

ticulate matter should be connected in my report of 1881 with the observed facts of distribution of small-pox around the hospital at the period in question. . . ." So too, as regards 1884 he notes, "And I find it to be the fact that two weeks before the singular spread of small-pox around the hospital in June 1884, there did exist exceptional atmospheric conditions very similar to those which had existed in January 1881, and which were indicated in my report on the 1881 epidemic as being associated with the notable outburst of small-pox around the hospital. In June 1884, as in January 1881, a belief in a potency of such conditions has served better than any hypothesis of human intercourse to explain the observed facts of the epidemic outburst within the hospital area.

"Thus :—

"There is evidence, alike from the experience of 1881 and of 1884, that small-pox has, on occasions, spread round the hospital to houses at all points of the compass in such a way that its spread cannot be accounted for unless its contagium has been conveyed through the general atmosphere : on such occasions there has been coincident peculiarity of atmospheric conditions."

Mr. Power, however, goes on to say that all the circumstances he observed during the 1884 outbreak are not capable of being explained by the presence of special atmospheric conditions, and he believes that, in addition to these, "there is yet some factor wanted to account for the production of the special events of January 1881 and June 1884."

We must refer our readers to the report itself for further information as to the meteorological conditions which Mr. Power has held to be associated with the spread of small-pox ; but, as regards his contentions generally, after his 1884 investigation, we may add that Dr. Buchanan, on receiving the report, expresses his opinion that there cannot be any question of the facts upon which the conclusion as to the spread of small-pox from the hospital at a time when only nine patients had been admitted was based, nor of the validity of the inference drawn from those facts. As to the conditions favouring the occurrence, Dr. Buchanan says that Mr. Power "gives reason for expecting that other factors determining this ability of small-pox (to spread from the hospital) remain to be discovered, some of them being concerned in the very nature of small-pox itself. The variable

potentiality of infectious disease was a fact known to our ancestors, who spoke of its differing ability to prevail as an epidemic in a community as being determined by the 'constitution' of the time, and of its varying power to injure the individual as being determined by the 'type' of the disease. I suspect we may have in Mr. Power's recent researches the beginnings of a better understanding of these things."

Since 1884 this subject of the influence of metropolitan small-pox hospitals in the neighbourhoods around them has evidently received the continuous attention of the Medical Department of the Local Government Board; and Dr. Buchanan, in the report which he has just issued,¹ and which it is the immediate purpose of this article to consider, has placed before the medical profession and the public his view as to the full significance of the facts which have been ascertained. Whereas his department at one time stood all but alone in believing in the serious influence of such hospitals as are under consideration, the same opinions are now endorsed on nearly all hands. Thus, Dr. Buchanan's own experience being limited to Fulham, he now notes how far the recent experience of other parts of the metropolis is in accord with that which Fulham afforded. On this point he says:—“(a.) The Health Officers of Camberwell and of Greenwich, reporting on the year 1884, tell of excessive prevalence of small-pox upon the portions of their districts near to *Deptford* hospital. (b.) The Health Officer for Lambeth, reporting for the same year, records the same thing for *Stockwell* hospital, 53 out of 138 cases in that large parish at the commencement of the 1884 epidemic having occurred in the houses within a quarter-mile of this hospital. (c.) Dr. Tripe, examining the number of cases removed to hospital during certain months of 1884, from various areas around *Homerton* hospital, represents them as 133, 52, 12, and 4 upon equal populations living within a quarter-mile circle, a more-distant quarter-mile zone, a following half-mile zone, and the rest of the parish. (d.) Dr. Gwynne shows, for *Hampstead*, that during the 1881 epidemic, when the hospital was closed, 0·58 per cent. of the houses were attacked in the parish, those

¹ Supplement to the Fifteenth Annual Report of the Local Government Board. 1886 [C.—4844—I.].

within a quarter-mile of the hospital suffering to the extent of 1·5 per cent., whereas, in the epidemic of 1884, when the hospital was open, 1·9 per cent of the total houses of the parish were invaded, those within a quarter-mile of the hospital suffering to the extent of 20·9 per cent. And the Health Officer of St. Pancras has told a like story for the parts of his district adjacent to Hampstead.—Thus much we learn of the London districts that have relation with other small-pox hospitals of the Asylums Board; and similar experiences reach me as to Highgate and West Ham hospitals, which are situated on the edge of the metropolis, and receive London patients amongst others.”

Practically, then, we may take it for granted that amongst those who are capable of forming a judgment on the matter, and who have had personal experience of the facts, there is unanimity of opinion as to the fact that injury has been brought about by the metropolitan small-pox hospitals. It is true that the Registrar-General, looking at the matter from the point of view of *registration districts* and of *deaths*, has not felt confident that the mischief of such hospitals to the areas they are placed in counterbalances their advantages. But, as pointed out by Dr. Buchanan, registration districts and deaths are not well adapted to the discovery of the facts; indeed, the boundaries of the former bear no comparison as regards fixed relation to hospital areas with the circles and zones selected by Mr. Power. But even taking these registration districts, and the fatal attacks alone of small-pox, Dr. Buchanan shows they are of value, in so far as they may furnish evidence of “*change of rank*” of a district (as regards small-pox) after the establishment of a small-pox hospital in or near it, and of change in its rank contemporaneous with the use or disuse of that hospital. “And any one appealing to the reports of the Registrar-General may see how Hampstead regained its position in 1879-83 while the hospital was closed, small-pox still being abundantly present in London, and how it lost its position again in 1884 after the hospital recommenced its operations. So he may see how Hackney and Camberwell, which for twenty years before 1870 stood among districts of the first rank in regard of their freedom from small-pox, afterwards became debased to a place among

the worst. They are shown by the Registrar-General (Annual Summary for 1884) contesting with each other and some eastern parishes which shall show the largest yearly mortality from small-pox. This was after the establishment of Homerton Hospital in Hackney in 1871, and of Stockwell and Deptford Hospitals on either side of Camberwell in 1871 and 1877 respectively."

These considerations, based on the views of metropolitan health officers, and on the statistical evidence afforded by metropolitan death registers, would alone have sufficed to call for comment from the chief medical adviser of the Government. But since Mr. Power's report on the 1884 epidemic further investigations have been in progress as to Fulham Hospital. At the present time this question has obviously come to be a pressing administrative one, and hence Mr. Power, doubtless acting under his chief's instructions, has, in his last contribution, made no attempt to indicate the method by which the hospital operations may have become associated with observed small-pox incidences; he has limited himself "rather to gauge the proportions of the mischief attributable to the hospital than to consider afresh the means whereby this mischief may have been effected."

Between September 1884 and August 1885 small-pox was again epidemic in London. But a further change had been made in the method of dealing with it. An order of the Metropolitan Asylums Board restricted from October 1884 the number of cases in any intra-urban hospital to twenty-five, and with but occasional exceptions this was adhered to; so, also, a system admirable from the point of view of administration, of taking small-pox cases to hospital ships at Long Reach, and of transferring "convalescents" to hospital camps at Darenth was further elaborated. At the same time movements to and from the metropolitan hospitals were subjected to increased control, the most rigid restrictions practicable being enforced. Before the recurrence of small-pox in the autumn of 1884, small-pox ceased to affect the special area though it lingered somewhat in the other portions of the three parishes involved. But small-pox coming now from a variety of London parishes besides these three, the operations of Fulham began to grow. They were still "insignificant," but such small-pox as did occur between

September 14th and November 22nd affected the 0— $\frac{1}{2}$ mile portion of the special area about three times as much as it did the $\frac{1}{2}$ —1 mile zone. Then came larger hospital operations and a wider diffusion of the mischief, and “to sum up the whole period of hospital operations, 25th May 1884 to 26th September 1885, the incidence of small pox on houses of the special area was twice as great as that on the rest of the three parishes, and the incidence on the 0— $\frac{1}{2}$ mile division of the special area, nearest the hospital, three times that on its $\frac{1}{2}$ —1 mile zone. Similarly the incidence of small-pox on this outer division of the special area was nearly one-third greater than that on the rest of the three parishes.” In the report itself many interesting details concerning this fresh experience during 1884-85 will be found. Sudden increases of disease appeared to have borne relation to the number of admissions of acute cases. A scarlet-fever hospital adjoining could not be kept free from infection except by re-vaccination of convalescents. Passing by considerations of this sort, we proceed to record that the total results of the admission of 585 acute cases of small-pox between the 25th May 1884 and 26th September 1885 were as follows:—The rate per cent. of houses attacked in the special area was 1·770, whereas it was 0·840 beyond. And taking the concentric areas, zone by zone, it was 7·912, 2·844, 1·320, and 0·875 respectively as we pass from the hospital as centre to the outside of the circle. From the fresh facts elicited Mr. Power considers there is ground for one broad inference. “It is, that the aggregate of changes introduced into the administration of Fulham Hospital since the epidemic of 1881 have had little or no influence upon the quantity of small-pox distributed, during the recent epidemic, through hospital agency over the houses of the neighbourhood. Under former conditions, each 100 cases received into Fulham Hospital were responsible in some way or other for a certain definable quantity of small-pox in the houses round the hospital. Under present conditions, each 100 so received have been responsible for at least as much as before.”

We now arrive at a period when the total outcome of the several investigations as to Fulham Hospital may be set forth. These are shown in the following Table:—

TABLE C.—SHOWING PERIODICAL DISTRIBUTION OF SMALL-POX ON AREAS IN CHELSEA, FULHAM, AND KENSINGTON, AROUND FULHAM HOSPITAL.

| Period. | Comprising. | Acute Small-pox Cases admitted to Fulham Hospital in Period. | Number of Houses invaded by Small-pox during Period; the Houses being situated at the several Distances from the Hospital as shown below. | | | | | | | Rate per cent. of Houses. | | | | | |
|---|------------------|--|---|--|---|--------------------------------|--|-------------------------------------|------|--|--|--|-----------------------------|---------------|----------------------------------|
| | | | Within a quarter Mile Circle. | $\frac{1}{4}$ - $\frac{1}{2}$ Mile Zone. | In $\frac{1}{2}$ - $\frac{3}{4}$ Mile Zone. | In $\frac{3}{4}$ -1 Mile Zone. | Within One Mile, being the Special Area. | In Remainder of the Three Parishes. | | $\frac{0}{4}$ - $\frac{1}{4}$ Mile Circle. | $\frac{1}{4}$ - $\frac{1}{2}$ Mile Zone. | $\frac{1}{2}$ - $\frac{3}{4}$ Mile Zone. | $\frac{3}{4}$ -1 Mile Zone. | Special Area. | Remainder of the Three Parishes. |
| | | | | | | | | | | | | | | | |
| <i>March 1876 to March 1877. . .</i> | <i>12 months</i> | — | 1 | 2 | | 7 | 18 | 126 | | ·23 | ·05 | ·18 | ·19 | ·15 | ·54 |
| <i>March 1877 to end of 1877.</i> | 9 " | 327 | 15 | 48 | 54 | 13 | 130 | 202 | 3·47 | 1·37 | 1·27 | ·36 | 1·10 | ·86 | |
| <i>January 1878 to September 1878</i> | 9 " | 714 | 20 | 89 | 78 | 24 | 211 | 157 | 4·62 | 2·55 | 1·84 | ·67 | 1·80 | ·67 | |
| <i>September 1878 to September 1879</i> | 12 " | 679 | 19 | 92 | 63 | 23 | 197 | 110 | 4·40 | 2·63 | 1·49 | ·64 | 1·68 | ·47 | |
| <i>September 1879 to December 1880</i> | 15 " | 292 | 8 | 37 | 13 | 10 | 68 | 24 | 1·85 | 1·06 | ·30 | ·28 | ·58 | ·10 | |
| <i>December 1880 to December 1881</i> | 13 " | 1,778 | 32 | 132 | 116 | 52 | 332 | 264 | 7·59 | 3·77 | 2·74 | 1·45 | 2·83 | ·80* | |
| <i>December 1881 to May 1884. . .</i> | 28 " | — | — | 3 | 8 | 1 | 12 | 47 | — | ·07 | ·16 | ·02 | ·70 | ·13 | |
| <i>May 1884 to September 1885. . .</i> | 15 " | 585 | 36 | 108 | 75 | 42 | 261 | 277 | 7·91 | 2·84 | 1·32 | ·87 | 1·77 | ·84 | |
| <i>Whole period of hospital operations.</i> | 6 years. . | 4,375 | 130 | 506 | 400 | 165 | 1,201 | 1,041 | 30·1 | 14·5 | 9·5 | 4·6 | 10·2 | 3·1 | |

NOTE.—The figures in italics are for periods when Fulham Hospital was not in use for small-pox. None of these figures, therefore, are included in the bottom line of the table. The rates of that line are taken on the basis of the 1880-81 survey.

* Correction has been here made for peripheral growth of the parishes as learned from the census of 1881. Before that census was available, the more distant houses were taken on the enumeration of 1871, with the result of giving too high a rate for parts beyond the special area.

With these repeated experiences as to Fulham, supplemented by very similar ones noted by metropolitan health officers as regards other London small-pox hospitals, Dr. Buchanan has, as we have said, dealt in his recent annual report, and we cannot do better than quote that portion of the document which sums up this total metropolitan experience.

"The whole of the experiences now on record concerning the districts of London which are in special relations with small-pox hospitals combine, I think, to form a very strong corroboration of the view of the Commission of 1881, that in the metropolis all small-pox hospitals share the disastrous

ability of Fulham Hospital to spread small-pox "by some means or other" (as the Commission has it) over the neighbourhoods around them. This ability is now, I hold, proved to extend to the distance of at least a mile, and to be independent of lines of human communication. It has now been shown to be exerted when the number of acute cases in a hospital has been restricted to twenty or thirty, and it was on one occasion exerted when only five acute cases were in hospital together. It has not been extinguished, as Mr. Power's recent researches and the reports of health officers show, by the regulation of methods of transit, or by the removal of opportunities for personal communication with patients in hospital.

"It is to this influence of hospitals in maintaining small-pox over large areas of the metropolis that I must needs ascribe a measure of that excess which has recently become conspicuous in the small-pox death-rate of London as compared with that of the provinces. Some such excess has indeed been visible from earlier times, before London was provided with small-pox hospitals, and it was justly ascribed to a greater neglect of vaccination in London. But of recent years a new factor has plainly come into operation. Whereas in five-year periods before the great European epidemic of 1871, the small-pox death-rate of London only once reached the double of the provinces, it has in the last two of such periods been maintained at a point six-fold and seven-fold that which has affected other parts of England; and this has been the case notwithstanding the amendments in London vaccination practice, which have had the effect of reducing, below any former experience, the small-pox mortality of children. This changed attitude of London towards the provinces in respect of small-pox (see figures in footnote¹), dating from the time when London and

¹ These figures reproduce and bring down to later times the information furnished by myself to the Hospitals Commission of 1881.

| Period. | a. 1838-42. | b. 1847-49. | c. 1850-54 | d. 1855-59. | e. 1860-64. | f. 1865-69. | g. 1870-74. | h. 1875-79. | i. 1880-84. |
|-------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| London . . | 755 | 460 | 300 | 237 | 221 | 276 | 654 | 292 | 244 |
| Provinces . | 547 | 274 | 271 | 192 | 175 | 122 | 389 | 48 | 34 |

Or, if we should represent the rate of London by a constant 100, the

| | | | | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Rate of Provin- | 72. | 59. | 90. | 81. | 62. | 44. | 59. | 16. | 14. |
| ces would be | a. | b. | c. | d. | e. | f. | g. | h. | i. |

not the country became plentifully supplied with hospitals for the disease, deserves especial consideration by any whose first thought is for the aggregate metropolis. For those whose concern is with the particular sections of London, the facts will suffice that the five intra-urban small-pox hospitals in London have excess of small-pox around them; and that in the case of the hospital which has been specially studied, this excess has amounted (during such portions of ten years as have seen the hospital at work, but not during other portions of the ten years when it was shut) to a three-fold incidence of small-pox upon the three nearest square miles as compared with its incidence in the remainder of circumjacent districts.

“In my last annual report I pointed out that, while the view of the Royal Commission that thirty or forty acute cases of small-pox might safely be treated in hospitals within the metropolis had guided the action of the Metropolitan Asylums Board, that body had not seen their way to acting on the further view of the Commission which attached ‘paramount importance’ to reducing, by means of contrivances which the Commission believed might be devised in the construction of hospitals, ‘within the smallest limits the chance of spreading infection.’ Inasmuch as, on the evidence afforded during 1883—85, it may now be confidently said that the limitation of numbers within the several intra-urban hospitals has not had the result that was hoped for, I submit that the time has now come when the other means recommended by the Commission for ‘reducing the chance of spreading infection’ ought to be tried.”

In this closing sentence Dr. Buchanan evidently refers to the erection of small-pox hospitals so contrived that all air passing out of them shall be so dealt with that any contained organic matter shall be first destroyed.¹

One point alone remains to be noticed. Dr. Buchanan on the present occasion, like Mr. Power in his last report, deals solely with the results which the Fulham hospital has brought about

¹ The Royal Commission on Small-pox Hospitals report as follows:—“We fully believe that contrivances for this purpose might be devised, and we again call special attention to the evidence on this head which has been furnished by Dr. Burdon Sanderson.” Report of 1882 [C.—3314].

each time it has been used for small-pox, and he purposely avoids discussing the means which have led to these results. It is for this reason that we do not propose to discuss a report by Dr. Bridges on small-pox hospitals in London, which by request of the President of the Local Government Board, Dr. Buchanan has embodied in his recently issued volume. Dr. Bridges does not dispute Mr. Power's facts: indeed he draws from them a very similar inference to that which Dr. Buchanan has done; and the main body of his report is taken up with the consideration of the aërial theory of dissemination. This, however, is not touched upon by Dr. Buchanan, and is, for the purposes of his present report, not in question.

CHOLERA IN JAPAN.

IN a report compiled under the directions of Nagayo Sensai, director of the sanitary bureau of Japan, and in extracts from similar reports contained in the *Sei-i-Kwai* medical journal we find some account of cholera as it has affected the Japanese Empire. The first official record of its introduction relates to 1876, when the disease was conveyed from Amoy into the port of Nagasaki in the western island of Kiusiu. There were however undoubted cholera epidemics in 1822 and 1858, although no statistical information is available concerning them. But it is known that at both those dates cholera was prevalent in China and adjoining states, and there is the strongest evidence that the disease first appeared in Japan at Nagasaki, which was then the only port open to foreign commerce.

The 1876 prevalence was a very fatal one. In the following year, 1877, cholera re-appeared in several of the prefectures but not to such an extent as to constitute an epidemic. But it was on this occasion again imported into Nagasaki through a sailor from a merchant vessel, and it then spread very rapidly; the cases coming under notice amounting to 13,710. Of these 7,967 were fatal, the percentage of deaths being 58.11. During

